AMERICAN VETERINARY REVIEW,

JULY, 1878.

ORIGINAL ARTICLES.

A CONTRIBUTION

TO THE PATHOLOGY AND ÆTIOLOGY OF HUMAN AND ANIMAL VARIOLÆ.

TRANSLATED BY F. S. BILLINGS.

(*Continued from page* 102.)

——:o:——

HOW DO OTHER ANIMALS AND MAN DEPORT THEMSELVES TOWARD THE CONTAGIUM OF V. OVINA?

In general, the contagium of v. ovina deports itself in this direction similar to that of v. humana. It has the faculty to complicate other animal species, in but an insignificant degree. As already mentioned, a local infection of men with ovina from accidental injury when inoculating sheep, has been reported in isolated cases; a sort of positive inoculation. Goats have been in very isolated cases infected by the contagium of v. ovina in a volatile (or dispersing) form, that is, when in the same stable with diseased sheep; it generates by them a general exanthema accompanied by high fever, which deported itself in a manner

exactly corresponding to v. ovina verra. Goats react against inoculation with ovine similar to the sheep; which corresponds to their near zoological relationship. In seldom cases a variolic eruption has been observed by swine, for instance, when they have been introduced in an uncleaned and non-disinfected sheep-pen, in which variola-diseased sheep have been confined. Aside from the numerous resultless inoculations with ovine, by horses, dogs, rabbits, hares, and fowls, I will mention that inoculations of cattle generated a local pustule—Sacco—and that positive results have also been received by rabbits—Gerlach—; re-inoculation of sheep gave positive results.

With regard to the deportment of sheep towards the contagium of v. humana and that of other forms, the action of vacci nation is especially worthy of our attention. Vaccination of sheep gives as a rule a positive result, pustules develop as by ovination; however we frequently find pustules have developed on places where the animals were not inoculated, or in other words an exanthema develops similar to that of v. ovina vera. Sheep have a great inclination to generalize vaccine, and therefore the action of the same is entirely different with sheep as by man, by whom a general eruption is never observed. The assumption of some authors that this ovinisated vaccine is entirely identical with v. ovina vera, appears as yet to want the necessary proof. Another metamorphosis which vaccine suffers in the ovine organismus is worthy of our attention; it acquires the ability to disperse itself as a volatile contagium, while the original vaccine is of a fixed nature.

Variola porcina is a seldom disease, and the reports of the same which are to be found in the literature are worse than scanty. According to its course, duration and termination, in severe cases it bears the strongest resemblance to v. humana and v. ovina, in a light form to human varalois, in other, but very seldom cases, to the varicella of man. According to the descriptions which we have, the porcine variety complicates mostly young animals; the exanthema being distributed over the entire body. They are in the beginning chiefly situated along the dorsal or abdominal surface, at another time along the mammæ, and from

here extend over the body. From the petechiæ develop noduli and pustulæ with a yellowish contents, which finally dries and form eschara, which fall off. While those cases are of a harmless nature which resemble the varicella of man, in others the disease assumes a malignant form, 20—25 of the young animals which become diseased perishing. Fischer has experimentally proven the infectious nature of this lighter or varicella-like form, while by other severe invasions the infectious nature of the pest is directly proven. I must also say that it is very probable that various variola-like exanthemata of swine have been mistakenly held for variola porcina, and that we are yet in want of exact descriptions of the latter.

As variola porcina is a seldom occurrence, generally limited to isolated herds and stables, it is natural the next question should be: *from whence does it come?* If we follow the different intimations which may help us on our way, we find single cases of v. porcina by which it is reported that concomitantly a similar exanthema was observed by cattle, or that v. vaccina was prevailing in the vicinity, or that v. ovina was prevailing in the neighboring districts. The development of v. porcina from v. ovina seems to me proven by one observation, according to which young swine were attacked by variola after being brought into an uncleany and non-disinfected sheep pen, in which variolic-diseased sheep had been confined some months previously. The disease was transmitted from the diseased young pigs to other pigs which had not been in the stable in question. By the unquestionable connection of v. caprina with v. ovina, speaks also the experimentally successful transmission of v. porcina to goats and vice versa.—Gerlach—for the genetical connection between v. ovina and v. porcina.

I have already spoken of the fact that v. humana may be transmitted to swine. It must for the present remain an open question whether v. porcina is in condition to generate variolois by man or not, as in late literature nothing pro or contra is to be found. According to what has been said, I can scarcely consider v. porcina as a disease sui generis, as the continuity of the individual attack fails entirely; it appears sometimes here and sometimes there, and therefore we must consider this disease more as

exactly corresponding to v. ovina verra. Goats react against inoculation with ovine similar to the sheep; which corresponds to their near zoological relationship. In seldom cases a variolic eruption has been observed by swine, for instance, when they have been introduced in an uncleaned and non-disinfected sheep-pen, in which variola-diseased sheep have been confined. Aside from the numerous resultless inoculations with ovine, by horses, dogs, rabbits, hares, and fowls, I will mention that inoculations of cattle generated a local pustule—Sacco—and that positive results have also been received by rabbits—Gerlach—; re-inoculation of sheep gave positive results.

With regard to the deportment of sheep towards the contagium of v. humana and that of other forms, the action of vacci nation is especially worthy of our attention. Vaccination of sheep gives as a rule a positive result, pustules develop as by ovination; however we frequently find pustules have developed on places where the animals were not inoculated, or in other words an exanthema develops similar to that of v. ovina vera. Sheep have a great inclination to generalize vaccine, and therefore the action of the same is entirely different with sheep as by man, by whom a general eruption is never observed. The assumption of some authors that this ovinisated vaccine is entirely identical with v. ovina vera, appears as yet to want the necessary proof. Another metamorphosis which vaccine suffers in the ovine organismus is worthy of our attention; it acquires the ability to disperse itself as a volatile contagium, while the original vaccine is of a fixed nature.

Variola porcina is a seldom disease, and the reports of the same which are to be found in the literature are worse than scanty. According to its course, duration and termination, in severe cases it bears the strongest resemblance to v. humana and v. ovina, in a light form to human varalois, in other, but very seldom cases, to the varicella of man. According to the descriptions which we have, the porcine variety complicates mostly young animals; the exanthema being distributed over the entire body. They are in the beginning chiefly situated along the dorsal or abdominal surface, at another time along the mammæ, and from

here extend over the body. From the petechiæ develop noduli and pustulæ with a yellowish contents, which finally dries and form eschara, which fall off. While those cases are of a harmless nature which resemble the varicella of man, in others the disease assumes a malignant form, 20—25 of the young animals which become diseased perishing. Fischer has experimentally proven the infectious nature of this lighter or varicella-like form, while by other severe invasions the infectious nature of the pest is directly proven. I must also say that it is very probable that various variola-like exanthemata of swine have been mistakenly held for variola porcina, and that we are yet in want of exact descriptions of the latter.

As variola porcina is a seldom occurrence, generally limited to isolated herds and stables, it is natural the next question should be: *from whence does it come?* If we follow the different intimations which may help us on our way, we find single cases of v. porcina by which it is reported that concomitantly a similar exanthema was observed by cattle, or that v. vaccina was prevailing in the vicinity, or that v. ovina was prevailing in the neighboring districts. The development of v. porcina from v. ovina seems to me proven by one observation, according to which young swine were attacked by variola after being brought into an uncleany and non-disinfected sheep pen, in which variolic-diseased sheep had been confined some months previously. The disease was transmitted from the diseased young pigs to other pigs which had not been in the stable in question. By the unquestionable connection of v. caprina with v. ovina, speaks also the experimentally successful transmission of v. porcina to goats and vice versa.—Gerlach—for the genetical connection between v. ovina and v. porcina.

I have already spoken of the fact that v. humana may be transmitted to swine. It must for the present remain an open question whether v. porcina is in condition to generate variolois by man or not, as in late literature nothing pro or contra is to be found. According to what has been said, I can scarcely consider v. porcina as a disease sui generis, as the continuity of the individual attack fails entirely; it appears sometimes here and sometimes there, and therefore we must consider this disease more as

an offshoot, produced by the wanderings of the contagium of v. humana or ovina, perhaps also of vaccina, to swine. When an evidently infectious disease appears so seldom as v. porcina, while its genesis has been proven in single cases from v. ovina or humana, and when we cannot concede an obiogenetic development for the same, then everything must force us to the conclusion that v. porcina must take its origin from other forms of variola, ovina, vaccina or humana.

We will now proceed to consider the other main alveolic group, viz; the localized variolæ of cattle, horses and goats, and shall follow the same with consideration of variolæ by the dog, monkey, hare, camel, and domestic fowls.

Variolæ equinæ have won an undeserved importance in that Jenner sought in them the origin of variolæ vaccinæ.

By the great infrequency of this form of variola, at least in Germany, one looks in vain for exact and good descriptions of the same. [I must be excused from introducing an exact translation of the next few words, as I do not see any better form to put them into (B.).] I show you here two wax preparations from Sacco, which represent equina in different stages of development. Upon the pastern of one foot you see variolæ in the stadium of eruption, on the second in that of suppuration. You may also see two strongly prominent places which are hairless, the one as large as a 25c piece, the other as large as a silver dollar, slightly hyperæmic, and appearing somewhat like a pseudo-erysipelas upon the human finger. This erysipelatous tumefaction of the posterior face of the pastern is primarily hot and painful, and soon presents a moist surface. The infectious, sometimes pustulous exanthema generates by inoculation of its pathological product, equine, pure vaccina by cattle, and by man an exanthema resembling that produced by vaccine (Lafosse, Bouley, Depaul); by vehicles or harness—the exanthema may be extended to other horses.

The circumstance which at first appears remarkable, that variola is as a rule by the horse, represented by an erysipelatous or eczematous exanthema in the vicinity of the pastern, finds an easy explanation, when we remember, that the parts in question are frequently the subject of injuries or erosions which especially

favor the entrance of contagious elements into the system. Why pustules similar to those of the other forms of variolæ do not develop on the pasterns of the horse, probably lies in the anatomical construction of the relatively thick cutis of the parts in question. I lately inoculated a calf upon the ear with humanised vaccine, and there developed upon the same an eczema, but no pustules; while a calf inoculated shortly after (by Dr. Kranz and myself) upon the udder and valva presented well developed vaccine pustules.

The same reasons which we have brought forward in considering the descent of v. pocina from other variolic forms, also lead me to consider the idiopathic development of v. equina as very doubtful. Entirely discarding an abiogentic origin, I must consider other springs as the fountains from which this so seldom (by us) appearing disease takes its origin. Bouley's assertion that v. equina is much more frequent than the original v. vaccina is even for France scarcely justifiable, as far as we can judge from the present literature, and not at all applicable to Germany. As it has been experimentally proven, that horses are susceptible as well for animal as for humanised vaccine, also for human variola, it seems scarcely necessary to go farther in seeking for the genesis of v. equina. We have already considered Scholz's observations with regard to the transmission of v. humana by diseased attendants to foals. That v. vaccina (bovina) cannot possibly owe its genesis to v. equina, is sufficiently proven by the simple fact, that v. vaccina comes to pass in all parts of Germany, while v. equina seems to almost entirely fail of representation.

Variolæ caprinæ is also a very seldom disease, for in the course of 20 to 30 years we can scarcely find a description of half a dozen cases. It comes to pass in two different forms: as a local process—similar to v. vaccina—upon the udder, and also as a general exanthema, accompanied by fever. As a localized affection, the caprine form evidently corresponds to the bovine, and presents, like the same, an irregular development; and either proceeds from the same, or has a like origin. Although we find here and there assertions that the same form of variola have been met with coevially by goats and cows, yet goats, as a rule, remain exempt

from the disease when confined in the same stable with vaccina-diseased cows, and inoculations with the latter generally give only a negative result; therefore the disposition of goats for vaccine or better, for the ætiological agent of the same, is in all cases insignificant.

As a severe and general disease—although seldom—we meet with variolæ by goats which are confined in the same stable with variola-diseased sheep. In the place of further description, I quote a recent observation: "In a stable in which variola-diseased sheep were confined, three non-inoculated goats became suddenly diseased with variola, the exanthema of which exactly corresponds that of v. ovina. Upon the udder were to be found numerous pisiform variolæ in the form of hard flattened noduli, with little exudation of lymph; aside from these were to be seen variolæ distributed over the body, especially upon the median face of the posterior extremities, more isolated upon the abdomen, along the back and on the head. At the same time marked fever phenomena were present, the appetite failed, the lips were tumefied, a tolerably profuse muco-purulent flow was perceptible from the nasal cavities. Convalesence resulted in 14 days. Immediately on these goats becoming diseased, two others were inoculated upon the ear with ovine; by both a single inoculatory pustule developed, and both remained immune from v. ovina vera. Prietzsch.

From the above, it may be seen that v. ovina may be accidentally transmitted to goats; also that positive results follow the inoculation of the same with ovine. As we have seen, the so-called caprine variola owes its genesis either to v. ovina or to v. vaccina, or finally it may sometimes be traced to the same fountain of infection as the latter, and is homologous to the same.

With regard to the variola by other domestic animals, the data before us are so scanty that it is with difficulty that we can draw anything positive from them. Although in most Manuals of Pathology v. canina is described, yet I must say, that I have been successful in the new literature in finding but one description, that will allow us safely to deduce that by dogs a true variolous eruption takes place. Authors have attributed to such true canina variola, either an epigenetic origin, or traced the

genesis of the same to v. humana or ovina. Those exanthemata which have been generally looked upon as v. canina, may, in my opinion, be more justly considered as symptomatic cutical eruptions, which have nothing in common with true variolæ. Such variola, like exanthemata, frequently accompany the so-called distemper of dogs; they have, however, little resemblance to the variolæ of the other domestic animals; they continue six to seven days, and never form eschara or cicatrices. In other cases v. canina is said to possess more resemblance to varicella of man; we must not, therefore, leave out of consideration the possibility of the transmission of the same to children. When we, however, read that in such cases where a dog has 40 to 50 pustules resembling those of varicella upon the head, and that grown persons and children have, at the same time, suffered from a similar eruption, I cannot suppress the suspicion, (which is grounded on much experience), that in such cases the observers may have had before them a parasitic exanthema, such as herpes tonsurans or something similar. In other cases the variola-like exanthema, which comes to pass by dogs by the transmission of apthæ epizooticæ, and is especially located between the toes, may have given occasion to complication with variola. Aside from the previously mentioned experiments of Greve, I do not know of any other positive experiments in this direction. At least the dog has no susceptibility for the contagium of v. humana, except by inoculation, as infection of dogs by variolæ epidemics, where occasions enough are given on account of their intimate relations with diseased human beings, are as yet unknown. If we inoculate dogs with vaccine, we shall develop small bullæ filled with purulent elements, which possess an umbo, but only an unimportant pit; in individual cases it is reported that positive re-inoculations have taken place by children. Hamon.

Variola by the cat has not as yet been reported.

Several old and new observations are on record with regard to variolæ by monkeys, according to which in West Indies and America, the wild monkeys were affected by variola, when the latter was prevailing among the human race. Probably monkeys deport themselves towards vaccine in a manner similar to man;

at least Hamon reports having inoculated monkeys from successfully vaccinated dogs, and as having obtained well characterized pustules with a prominent pit, the contents of which were re-inoculated upon dogs with positive results.

Agnelli reports having observed an exanthema resembling that of v. vaccina by camels, in 1850, in Algiers, the lymph of which inoculated to man, protected the same from v. humana. Masson reports that in East India a variola-like eruption has been known for a long time to prevail by camels.

Of the wild mammalia, *hares* are said to be much subjected to variola, and especially in North Germany has this assertion won a considerable importance, as people have looked upon hares as the interposers and vehicles, frequently as the originators of v. ovina. According to hunters and foresters, this so-called variola of hares frequently assumes a malignant form. Aside from the fact that numerous endeavors to transmit ovine to hares have regularly been followed by negative results,—while rabbits are occasionally susceptible,—I do not in the least doubt, that that pathologic process which has been falsely designated as variola of hares, is nothing less than that constitutional and probably infectious disease described by me, which is characterized by the development of noduli and pustulæ in and upon the cutis, and which bears a resemblance to tuberculosis or syphilis and is designated in South Germany and Switzerland as "venerie" or "syphilis of the field hares."

Similar to the variola of hares is that of fowls, except with this difference: that by the latter an infectious exanthema much resembling true variolæ does in reality come to pass. This exanthema is, however, in its anatomical characteristics, sharply distinguished from variola; and, according to its essential character, is to be distinguished as a contagious epithelioma. I have observed and described this very interesting disease as I saw it in a henery in Zurich, and have again found exactly the same disease in several old preparations at München. This disease, characterized by its epithelial actions, presents itself as an epizootic pest of the domestic fowls, and probably also by other birds. It is chiefly localized upon the head, and produces a contagium of great

tenacity. I must also mention that in France the variola of the turkey, which probably should be classed here, has often been looked upon as the cause of v. ovina.

Variola vaccina.—As to its seat: we find vaccina as a local exanthema, as a rule, upon the teats; less frequently, concomitantly upon these and the udder; exceptionally, it is limited to the udder alone. V. vaccina distinguishes itself sharply from other forms in that it comes to pass almost always by female animals, and by these only upon the udder, and during lactation. After an incubation's stadium of three, four, six days, we see the development of the characteristic pustules following on a stadium of hyperamia, tumefaction, noduloi, and bullæ development, and completing their course in from five to six, less frequently in from eight to ten days. The number of variolæ is generally not extreme; it is seldom that we find twenty to thirty present at one time. The variolæ are generally lenticular to pisiform—sometimes larger, to two cen. in diameter—generally of a round form, the centrum somewhat indented; sometimes, however, the umbo entirely fails, or is only slightly intimated, or in the centrum we simply find a dark point; in other cases the variola is slightly elevated, conical or accuminated. Frequently the variolæ, as such, present nothing characteristic, are quite flat, and entirely without the pit; the entire process is so unimportant that it may be easily overlooked. The finer construction is similar to the human variola. That the variolæ have interiorly a retriculated structure is easily to be perceived, as upon puncture we are never enabled to remove the whole contents, but must press the same out. In the virulent stadium the contents is clear and colorless, later purulent and no longer infectious.

The color of the vaccine variolæ is on the one side determined by the *stadium of efflorescence*, on the other side by the color of the udder. While on the light udder of white or light colored cows the variolæ appear bluish-white and pearl-white, we find them yellowish in color on the dirty yellow colored udders of dark cows. Sometimes the variolæ have a silver lustre, lead-gray, amber color, or the lustre of mother-of-pearl. The especially peculiar silver or mother-of-pearl color, comes frequently only

to appearance, when we extend the cutis. The red hyperæmic umbo may occasionally fail, or is only intimated; on the contrary the subpustulous cutis, sometimes also the subcutis, is inflamed, indurated and distinctly prominent. Desiccation of the variolæ begins on the eleventh or twelfth day, and a tolerably thick dark-brown eschar is formed, with horn-like transparent edges. After the separation of the eschar, which takes place in the third week, we observe an oval or roundish cicatrix having little characteristic in its appearance, which remains apparent a long time.

The non-concomitant eruption of the variolæ which frequently comes to pass, is especially worthy of our attention; by means of it, we see fresh bullæ and pustulæ by the side of desiccated eschara. This important circumstance has been especially emphasized by Hering and Reiter in opposition to the description of Sacco; and Reiter says expressly, that by the original bovine variolæ the entire development of the variolæ does not take place at one time, therefore they present a variable form and size; and that the retrograde processes correspond to this manner of development, so that the course of the individual variola is an acute one and completed in five or six days, and that developing and desiccated variolæ are present at the same time. The later erupting variolæ have, however, the same virulent contents as those primarily developed. I shall have again to refer to this irregularity in the eruption of the bovine variolæ, which is full of ætiological importance. I will here remark, that in contradiction to the same, inoculated bovine variolæ by cattle and man develop all at one time, mature at the same time, and are almost all alike in size and form.

From the above, which has by far not exhausted the range of possibility, you may see how difficult it is to present a "school picture" which is able to represent all the various forms of bovine variolæ; the same vary with regard to their eruption, their pit and umbo, their circumference, color; and it is easily conceivable that true variola vaccina may be as often mistaken and considered as a false form, as the contrary.

(*To be continued.*)

ANATOMY OF REGIONS.

Translated from Peuch and Toussaint, Precis de Chirurgie Veterinaire, by A. Liautard, M.D., V.S.

CONTINUED FROM PAGE 326, VOL. I.

AUDITIVE APPARATUS.

Serving to the perception of hearing, it comprehends three parts, one of which only is visible externally. It is the *external ear*, simply called the *ear*. The other two are concealed in the thickness of the temporal bone. They are called the *middle* and the *internal ear*.

EXTERNAL EAR.

It is limited externally by the concha or pavilion and a narrower canal formed by an incomplete annular cartilage and a bony canal, named in descriptive anatomy the *external auditory canal*. The membrana tympani separates the external from the middle ear. The interference of the surgeon is generally only applied to the external ear.

The pavilion of the ear has the form of a funnel notched upon one of its sides. Its mobility is quite great; thus the animal can at will turn its opening in all directions. The motions of the ears are independent from each other. The dimensions of the ears vary in limited proportion, a small being always a pretty ear. As for the direction, the ear must be vertical; dropping ears generally indicating a lack of energy. Two different organs constitute the pavilion of the ear: the outside, where the skin lines the internal face and reflexes itself upon its free border to cover also the external, including in its layers the cartilaginous frame. Externally, the skin is thin and generally covered with short hairs, those of the interior of the ear being much longer and finer. They somewhat conceal the opening of the auditory canal.

The concha gives the ear its form; thin towards its free border, it thickens as it becomes narrower; in its inferior part it forms only a tube about one centimeter in diameter, which through an annular ligament is continued and attached to the external auditory canal. It is not properly speaking a ring, but a cartilag-

inous band whose two extremities converge towards each other like the rings of the trachæ.

And again, the external auditory bony canal, hollowed through the thickness of the tuberous portion of the temporal, is closed at its bottom by the membrana tympani, which separates the external from the middle ear.

The auditory canal runs partly into the annular cartilage, as well as this one does for the cartilage of the concha.

A peculiar little muscle, the mastoido auricularis, laying against the internal side of the concha, has for duty to bring these three parts close together, a very limited motion.

The skin, at the annular cartilage, assumes characters which make it resemble mucous membrane; it contains a large quantity of peculiar glands analogous to sebaceous glands, the ceruminous glands, which secrete a peculiar substance, untuous, of a yellowish color when fresh, but ordinarily blackened with dust, the *cerumen* which is always found there varying more or less in quantity. It is possible that through an exaggerated secretion, this cerumen may accumulate in such quantity as to obliterate partly or in toto the external auditory canal. Cleanliness, however, remedies this trouble easily. In some special cases, by the itching it gives rise to by becoming irritating and rance, the cerumen gives rise to symptoms of vertigo. I am unable yet to say if it is this cerumen which is the cause of a peculiar affection, which I have seen in rabbits, and whose symptoms resemble those of cerebral lesions of the pons varolii, or of the cerebellous peduncles. The animal has a tendency to roll upon itself, or to turn round. At the post mortem, and already during life, when examining the ears, the auditory canal may be seen filled with concreted pus, and the membrana tympani perforated. The purulent collection has also penetrated in the semi-circular canals and the trochlæ. The irritation produced upon the extremities of the auditory nerve may be the cause of the symptoms exhibited by the animals.

The membrane of the tympanum is a membranous sheet separating the external auditory canal from the middle ear; it is oval, very thin and slightly concave; its circumference is attached upon the tympanal circle, small frame almost circular, but notched above-

This membrane has three layers: a middle one, fibrous, forming the membrana proper; an internal, the mucous membrane of the middle ear; and an external, formed only of the epidermic layer of the skin of the external ear.

We must also mention the presence of an adipous cushion which is always present, even in the leanest animals, and which surrounding the base of the concha forward, inwards and backwards, facilitates the motion of the organ.

Blood Vessels and Nerves.—The arteries of the ear are: the anterior auricular, coming from the temporal trunk, and which carries the blood to the internal face of the concha; the posterior auricular, furnished by the external carotid which runs between the skin and the cartilage—one of the divisions of which goes to the middle ear, and another to the adipous cushion.

The veins of the same name are larger than the arteries. They often anastomose together. The anterior auricular vein is almost always double.

The nerves are furnished by the second cervical pair and by the middle auricular, a branch of the facial. The former goes to the external tegument. The branches of the second going to the ear, are distributed to the internal face of the concha.

The diverse motions of the ear are produced by the muscles already described in the temporal and parotid regions.

The parotido auricularis carries the ear down and outwards; the zygomatico auricularis, external temporo auricularis, and external scuto auricularis, carry the opening of the concha forward; the internal temporo auricularis is antagonist to the parotido auricularis, therefore an adductor of the ear; the internal scuto auricularis turns the opening of the cartilaginous concha outwards. Of the three cervico auricularis, the superficial pulls the ear backwards and downwards, so do the middle and superior, but their insertion outwards on the concha, allow them to turn the opening of the cartilage outwards, and even backwards, according to the extent of their contraction.

Differences.—The size of the ear of the *donkey* and of the *mule* are proverbial; it is much longer than that of the horse, and is necessarily more inclined outwards. The thickness and

inous band whose two extremities converge towards each other like the rings of the trachæ.

And again, the external auditory bony canal, hollowed through the thickness of the tuberous portion of the temporal, is closed at its bottom by the membrana tympani, which separates the external from the middle ear.

The auditory canal runs partly into the annular cartilage, as well as this one does for the cartilage of the concha.

A peculiar little muscle, the mastoido auricularis, laying against the internal side of the concha, has for duty to bring these three parts close together, a very limited motion.

The skin, at the annular cartilage, assumes characters which make it resemble mucous membrane; it contains a large quantity of peculiar glands analogous to sebaceous glands, the ceruminous glands, which secrete a peculiar substance, untuous, of a yellowish color when fresh, but ordinarily blackened with dust, the *cerumen* which is always found there varying more or less in quantity. It is possible that through an exaggerated secretion, this cerumen may accumulate in such quantity as to obliterate partly or in toto the external auditory canal. Cleanliness, however, remedies this trouble easily. In some special cases, by the itching it gives rise to by becoming irritating and rance, the cerumen gives rise to symptoms of vertigo. I am unable yet to say if it is this cerumen which is the cause of a peculiar affection, which I have seen in rabbits, and whose symptoms resemble those of cerebral lesions of the pons varolii, or of the cerebellous peduncles. The animal has a tendency to roll upon itself, or to turn round. At the post mortem, and already during life, when examining the ears, the auditory canal may be seen filled with concreted pus, and the membrana tympani perforated. The purulent collection has also penetrated in the semi-circular canals and the trochlæ. The irritation produced upon the extremities of the auditory nerve may be the cause of the symptoms exhibited by the animals.

The membrane of the tympanum is a membranous sheet separating the external auditory canal from the middle ear; it is oval, very thin and slightly concave; its circumference is attached upon the tympanal circle, small frame almost circular, but notched above-

This membrane has three layers: a middle one, fibrous, forming the membrana proper; an internal, the mucous membrane of the middle ear; and an external, formed only of the epidermic layer of the skin of the external ear.

We must also mention the presence of an adipous cushion which is always present, even in the leanest animals, and which surrounding the base of the concha forward, inwards and backwards, facilitates the motion of the organ.

Blood Vessels and Nerves.—The arteries of the ear are: the anterior auricular, coming from the temporal trunk, and which carries the blood to the internal face of the concha; the posterior auricular, furnished by the external carotid which runs between the skin and the cartilage—one of the divisions of which goes to the middle ear, and another to the adipous cushion.

The veins of the same name are larger than the arteries. They often anastomose together. The anterior auricular vein is almost always double.

The nerves are furnished by the second cervical pair and by the middle auricular, a branch of the facial. The former goes to the external tegument. The branches of the second going to the ear, are distributed to the internal face of the concha.

The diverse motions of the ear are produced by the muscles already described in the temporal and parotid regions.

The parotido auricularis carries the ear down and outwards; the zygomatico auricularis, external temporo auricularis, and external scuto auricularis, carry the opening of the concha forward; the internal temporo auricularis is antagonist to the parotido auricularis, therefore an adductor of the ear; the internal scuto auricularis turns the opening of the cartilaginous concha outwards. Of the three cervico auricularis, the superficial pulls the ear backwards and downwards, so do the middle and superior, but their insertion outwards on the concha, allow them to turn the opening of the cartilage outwards, and even backwards, according to the extent of their contraction.

Differences.—The size of the ear of the *donkey* and of the *mule* are proverbial; it is much longer than that of the horse, and is necessarily more inclined outwards. The thickness and

the greater weight of the cartilage of the concha necessitate a great force in the motor muscles of the organ.

The ear of the *ox*, more widely open than that of the horse, is depending outwards, its forward and backward motions being specially very developed.

The ear of the *cat*, conical, ordinarily erected, pointed, has an opening turned forward; its motion outward is always limited.

In the *dog* is found a great variation, according to different breeds—something erected and short, more or less, it may be long and hanging and covered with more or less long and silky hairs. It is customary to cut a portion of the concha in some breeds, the hemorrhage accompanying the operation being of no consequence.

The *pig's* ear varies much with the breed; it may be short, erected and pointed, or long and hanging, flattened and folded as in some dogs.

That of the *sheep* and *goat* has the external characters of that of the horse, with the inclined direction of that of the ox. In the breeds where the horns have a spiroid direction, as in the merinos, it makes its exit through the center of spire.

The little importance offered in the surgical point of view, in animals, by the middle and internal ear, induce us to pass them over without mentioning them. Rarely is there any occasion to observe diseases of the organs situated as deeply, and should a diagnosis be made of an affection of the internal ear, the propriety of an operation on it would scarcely occur to the surgeon.

In few cases, specially in dogs, diseases of the middle ear, and specially the perforation of the membrana tympani have been noticed.

The middle ear of the horse is remarkable by its communication with the guttural pouches already described.

I do not know if difficulty of hearing in cases of purulent collections of this pouch have been noticed. However these troubles may exist, as the guttural pouch communicates through the Eustachian tube with the box of the tympanum.

The physiological function of the guttural pouch is not well known. Is it in relation with the function of audition? Has it

only for object to give more width to the base of the cranium, thus to increase the size of the head without increasing its weight, and then fulfil a role similar to that of the sinuses of some cranian bones? These are questions yet unanswered, and that can be elucidated by close attention upon animals in which a diagnosis of complete repletion of these cavities could be made.

(*To be continued.*)

EDITORIAL.

AMERICAN VETERINARY COLLEGE.

The fourth annual *Announcement of the American Veterinary College* has just been issued, and all the friends of that institution will congratulate the Board of Trustees on the success which has crowned their efforts in establishing publicly in such official manner their legal rights to carry on their good work. The written opinion of the Attorney General leaves no more room for the doubt which might have existed as to the value of the diplomas and degrees granted by this body, under the recommendation of their faculty; but that is not the principal part, nor the most important step, obtained by the American Veterinary College. It is the recognition which is given them by the Board of Regents of the University of the State—a recognition which that Board is very shy of granting, and which is only given to schools and colleges which hold in the State a high professional standing. That the American Veterinary College is the *first of its kind*, and as yet *the only one* which enjoys such a valuable privilege, is no slight evidence of the appreciation of its work, and must be gratifying to its Alumni in rendering, if it was necessary, their diplomas more valuable.

VETERINARY EDUCATION.

Some time since, a gentleman of Philadelphia, Mr. Horace J. Smith, started a new movement in the direction of improving veterinary education in the United States; and to reach that effect, urged the importance of a liberal endowment for the establish-

ment of a veterinary school as a branch of the University of Pennsylvania. Under the name of "A Plea for Veterinary Science," a long essay is published by him in the Report of the State Board of Agriculture of Pennsylvania; and having the professional ability of Prof. J. Law, the plea speaks well in favor of the establishment of such a department in common education with the curriculum of that well-known medical school. This essay lays more stress than has been done before, upon the establishment of veterinary departments in medical schools, and the co-education of the "Andro" and Zoopath, as Mr. Smith reinvents the names.

For the benefit of the members of the profession who have not received a copy of the "Plea," we make an extract from the paper of Prof. Law, which will be found of great interest and one of the most valuable arguments in favor of Veterinary Science.

JURISPRUDENCE.

Read before the Montreal Veterinary Medical Association, by D. McEachran, F.R.C.V.S., President.

CONTINUED FROM PAGE 122.

SOUNDNESS.

Windgalls, if soft when the opposite leg is lifted to throw the weight on the leg, do not constitute unsoundness; but, if hard, and accompanied by thickening of the tendon or distension of the capsular ligament of the joint, it is unsound. Anchylosis of the fetlock of pastern joints constitutes unsoundness. Thickening of the tendons or ligaments at the back part of the leg, however slight it may be, must be considered unsound. The suspensory ligament is most important; it may be thickened in its body or branches. Next in importance is the tendo-perforans; next, the metacarpal ligament, and then the tendo perforatus. While an animal may be comparatively useful after injury of the two latter, he will seldom or never stand severe galloping after either of the former injuries. Osseous tumors of the large or small pastern bone, (*oss suffraginis or oss coronæ*) ringbone

which is a union of these two bones, (*Anchylosis*), whether complete or incomplete, is unsound. The size and form of the feet must be carefully noted. A very small foot, or a very large one, while they may be natural and may be healthy, indicate a tendency to lameness, but do not constitute unsoundness unless the size be the result of disease. General contraction of the foot or partial, that is, contraction of one quarter, may be caused by navicular disease, corns, or bad shoeing, and constitutes unsoundness. Corns, thrush, canker, seedy toe, sand crack, false-quarter, nuttor, pumiced foot, separation of the laminæ, resulting from laminitis indicated by flat sole, ridges on the wall, placing the heels down first and general stiffness of action, navicular disease, pointing, wearing of the toe of the shoe, wasting of the muscles of the shoulder, stiffness on starting, if not positive lameness, and in many cases thickening of the tendon and pain on pressure in the hollow of the pastern, dislocation of any of the joints of the limb, either partial or complete, is unsound. Knuckling forward of the fetlock, one or both, even in a slight degree, being indication of disease of the bones, (usually osteophytes), or contraction of tendons or ligaments, notwithstanding the contrary opinions usually given, must be considered unsound, not only as indicating disease, but by reducing the value of the animal. Proceeding to the hind leg, the quarter will be examined for atrophy or wasting of the muscles, indicatory of chronic lameness; the hip, for thickening of the tendon of the gluteus maximus or disease of the joint; the stifle, for distension of the capsular ligament, either of the joint itself (between the condyles and head of the tibia) or of the patella; the hock, for bogspavin and thoroughpin, either or both constituting unsoundness. Bonespavin in all degrees, or on whatever situation, is unsound. Cappedhock may be of such a nature as to be little detriment other than a slight blemish; on the other hand it may involve the bursa, the tendon, or the bone, and prove a serious and permanent injury. In all cases it lessens the value and is therefore unsound, but a modified opinion should be given according to the nature of the case. Curb in all degrees is unsound, more especially in crooked legs and badly formed hocks. The same remarks apply to the parts

below the hock as below the knee, and need not be repeated. All diseases of the skin, during their continuance, constitute unsoundness, but many of them are only temporary, easily cured, and a modified opinion should be given in such cases. The examiner having carefully examined the exterior, will proceed to have him tested for internal derangements, which are only to be discovered by the production of indicatory symptoms. Roaring, which is the name given to a hoarse noise made during inspiratiou, of which whistling, wheezing, and highblowing are merely modifications, is symptomatic of some structural change in the larynx, often atrophy or wasting of some of the muscles, disease of the laryngeal nerve, is unsound even in its slightest degree. It is to be detected by having the horse galloped at top speed. Thick wind, broken wind, chronic bronchitis, will be discovered by the same test; they are all unsound. Chronic cough, characterized by its short dry nature, not followed by clearing of the nostrils, is unsound. Adhesions of the pleuræ, indicated by short breathing and grunting when suddenly startled by raising a whip, or striking him on the ribs, indicates weakness of the lungs from previous disease, and constitutes unsoundness. All the diseases of the digestive organs, which are known to exist at the time of sale, render the animal unsound. Worms may be detected by the yellow mucus surrounding the anus, or by the tail having been rubbed, or they may be seen in the fœces. A horse known to be subject to colic is unsound, inasmuch as it indicates some organic, mechanical, or functional derangement which may cause death. Crib-biting and wind-sucking constitute unsoundness, as they invariably give rise to indigestion and render the animal less valuable and less useful. All diseases of the brain or nervous system known at the time of sale, even if they cannot be suggested by examination, staggers, shivering (*Immobilite*), chorea, (the most common form of the latter being stringhalt) constitute unsoundness. All diseases, acute or chronic, which cause even temporary alteration in the structure or functions of an organ, or system of organs, constitute unsoundness during their continuance, and the examiner must be careful not to overlook that which may appear trivial. Many a "slight cold" has resulted in

dangerous bronchitis or pneumonia, or has left a sequelæ chronic cough or roaring. Many a "slight weakness of the eye" has ended in blindness. Infectious diseases, such as influenza, strangles, catarrh, &c.; contagious diseases, such as glanders and farcy, should not only render the animal unsound, but a dealer who, while cognizant of their existence, exposes animals so affected for sale, should be severely punished and held responsible for all damages resulting from inoculation by them.

It will thus be seen that the duties and responsibility of a veterinary examiner are onerous, and require not only a thorough knowledge of his profession, but a certain amount of natural tact and quickness of observation which can only be acquired by experience. He must possess decision of character and firmness of purpose, to lift him beyond the influences of plausible representations or friendship, in the formation of his opinion. I trust the time has gone past when it is necessary to warn men of this profession against collusion with horse dealers. I feel satisfied, so far as those before me are concerned, it is unnecessary to refer to this practice; but it cannot be denied that connivance has often justly been charged to persons assuming the name of our profession, to the detriment of the whole body. Above all things, gentlemen, act honestly, uprightly, do justice to the best of your ability, be not influenced by flattery or friendship nor deterred by fear of offence, resting assured that "honesty is the best policy," and dishonesty will have its own reward.

EXTRACTS FROM FOREIGN JOURNALS.

By A. Liautard, M.D., V.S.

ON THE PATHOLOGY OF THE SO-CALLED PIG-TYPHOID, BY PROF. N. OSLER, M.D.

This is a paper, an abstract of which was read before the Pathological Society of New York, in which a series of experiments and post-mortem examinations are recorded, and which were made by the author, in company with Prof. McEachran.

Presenting, first, a few experiments proving the opinions expressed by Prof. Axe and Dr. Kleine, in relation to the con-

tagious and infectious nature of the disease. The symptoms are spoken of principally drawing the attention to the irregular range of the temperature, to the peculiarities presented by the cutaneous eruption and to the diarrhœa, which cannot be regarded as a constant symptom. In the part treating of the Pathology, careful notice is given of the lesions found on the intestinal canal. Specific lesions are grouped by the author as follows:

"1st. A brownish yellow infiltrate, very like diptheretic membrane, involving only the superficial layers of the mucosa, but frequently very extensive. On section it extends for a couple of lines into the mucosa, and cannot be separated without removing portions of that membrane.

"2d. Small greyish elevated spots, varying in size, from a pin's head to a split pea, seated directly upon and involving the mucosa to a variable depth; frequently the edges of the projecting parts overlay the mucous membrane. Others, older perhaps, are seen in process of separation, as small central sloughs, divided by narrow grooves from the mucosa, which may even be elevated about them.

"3d. Patches ranging in size from that of a three-penny bit to a penny or larger, circular, flattened, internally adhering to the mucosa, yellowish-grey in color, sometimes dark in the centre, and usually presenting a concentric arrangement resembling a flattened out rupia crust, or the cross section of a calculus. Sometimes these plagues are avoided, and frequently two or three have coalesced. Their concentric arrangement is their most peculiar feature, and is best marked in the larger ones, where a central part can often be seen from which the process appears to have extended in zones. Some of the smaller ones differ from these, the surface being uniform and more prominent. On section the patches show a yellowish white color throughout, and involve the coats of the bowel to a variable depth; some being confined to the upper part of the mucosa, others extending through its whole thickness; while others, again, involve the submucosa and muscular coats. They are firm and tenacious, not friable, resisting the scraping of a knife better than the mucous membrane itself.

"4th. Uniform involvement of large areas of the intestine,

converting the mucous surface into a yellowish irregular structure, like wash-leather, and in some instances extending through all the coats to the peritoneum, rendering the wall thick and inflexible.

5th. In two cases most peculiar masses were met with in the colors, looking like warty excrescences, springing from the mucosa; they are oval, and lie transversally to the axis of the gut, encircling about three-fourths of the tube and projecting from half an inch to one inch into the lumen. In the transverse directions they present a rounded concavity, while in the long axis of the bowel they are convex; the surface is dark or yellow-brown, and sometimes shows concentric lines. On section a firm greyish-yellow structure is disclosed, very dense, and involving all the coats to the peritoneum, which is puckered and retracted over the site of the attachment."

After passing an examination of the histology of the lesions found, Prof. W. Osler closes the paper by the following conclusions:

"1st. The so-called pig-typhoid is a disease *sui generis*, presenting anatomical and clinical features distinct from any other affections.

"2d. It presents no analogies, either pathologically or clinically, with typhoid fever in man.

"3d. Neither has it any affinity with anthrax, as claimed by some continental writers.

"4th. If we take the intestinal lesions as characteristic, the disease must be regarded, with Dr. Murchison, as dysenteric in its nature, although the cutaneous and pulmonary affections, as well as certain of the clinical features, meet with no parallel in human dysentery."—*Veterinary Journal.*

IS THE HIGH TEMPERATURE OF SOME ANIMALS THE CAUSE OF THEIR IMMUNITY TO CARBUNCULAR DISEASES?

BY PROF. COLIN.

This is the result of a number of experiments made by this celebrated physiologist in opposition to others made which had a

tendency to show that if some animals were refractory to the contagion or inoculation of anthrax it was due to their high temperature. Performing those experiments upon six hens, two pigeons, a cat and a dog, in which the temperature of the body had been diminished by cold baths, Prof. Colin arrives at the following conclusion :

"1st. There is no constant connection between the normal temperature of these animals and their aptitude or non aptitude to contract anthrax. At equal degree some are, others are not apt to contract this affection.

"2d. The artificial lowering of the temperature of the gallinaceous to 40 degrees *c.* does no facilitate the development of anthrax, though at that temperature sheep, rabbits, and other species will develop it with rapidity.

3d. The lowering of the temperature at 38 and 37 degrees, in carnivorous such as adult cats and dogs, is also powerless in the development of the disease.

4th. The cutaneous or sub-cutaneous low temperature exaggerated even by denudation or cold bath seem to have but little influence upon the manifestation of the accidents on the parts where the virus has been inserted.—*Archives Veterinaires.*

A PLEA FOR VETERINARY SURGERY.

Abstract from the Report of the Pennsylvania Board of Agriculture.

BY PROF. J. LAW, F.R.C.V.S.

SEPARATE AND CONJOINED STUDY OF THE MEDICINE OF MAN AND ANIMALS.

We have seen that in the days of Hippocrates medicine was to a large extent one, the physician was, in many cases, a veterinarian as well, and took lessons in anatomy, physiology, pathology, and therapeutics from his practice on the lower animals. For many, this catholicity of feeling and action produced a breadth of

view and soundness of practice which has served to rescue their names from oblivion, and hand them down to us as the *fathers of medicine.*

In modern times a similar course has secured most of the great advances in medicine and surgery, and physiology and therapeutics. If we open a modern work on physiology, we see that almost every step in advance has been gained from observations made on the lower animals. To illustrate this would be to furnish a large volume. Our knowledge of the functions of the nervous system, of circulation, of sanguification, of absorption, of nutrition, of secretion, etc., is almost entirely due to observations made on the lower animals. As medicine has advanced, this investigation of the lower creation has been resorted to more and more, and can be traced down from the labors of Harvey, of Haller, of Legallois, of Charles Bell, of the Hunters, of Flourens, and of Majendie, to the great host that are now engrossed in this profitable field of study.

If we pass to pathology the case is nearly the same. Many of the most complex pathological processes owe the elucidation of their nature, progress, and results to observations made on animals. The phenomena of inflammation as a generic morbid process have been studied on animals in a way in which it would have been impossible to do on man, and the descriptions given of inflammation and its products, are descriptions drawn from animal pathology. Fever, too, presents facilities for study in animals, which could not be obtained in the human subject, and these have been availed of to elucidate points that would otherwise have remained in obscurity. (See as a single illustration of this, the English Royal Commissioner's Third Report on the Cattle Plague.) The service rendered in regard to the other morbid processes is well illustrated by the treasures of the Hunterian museum, and by the works of pathologists from Hunter's day to this.

In surgery an analogous obligation has been incurred. Plastic operations, the methods of repair in fractures, tenotomy, hæmostatics, subperiosted section, and a host of other brilliant advances in modern surgery, were based upon observations made upon animals. Some, indeed, like tenotomy, were first practiced by veter-

inarians on domestic animals, and afterward appropriated for the relief of man.

When we enter on the list of contagious and parasitic diseases, we are at once brought face to face with a sanitary question of supreme importance alike to man and to his living possessions. Several of the specific and contagious diseases of animals are communicable to man, with a more or less deadly effect. Many, also, of the parasites of animals inhabit the human body as well, and the result of their entertainment is not unfrequently fatal to the human bearer. As both the contagious and parasitic diseases are propagated by germs produced in countless numbers in the body of the victim, it follows that the aggregation in a limited area of men and animals, in which they can live and increase enormously, enhances the danger to both kinds of victims. If physicians are left ignorant of the affection in the beast, and veterinarians of the same in man, they each miss the golden link which would reveal the true nature and dangers of the disease, and enable them to contend with it successfully.

SPECIFIC DISEASES COMMON TO MAN AND ANIMALS.

Without entering extensively upon the subject, I will note a few of the more fatal diseases in which men and animals reciprocate:

Asiatic Cholera.—The implication of domestic and wild animals in this disease, has been extensively observed: In India, by Annisley, Tytler, Jamison, Searle, Chalmers, Rankin, Orton, Barrand, and others, and in Europe by Jænichen, Kleinert, Cohen, Hensinger, Carrere, Hildebrand, Hering and Dick. Recently Thiersch, Burdon, Sanderson, Crocq, and others, have investigated the disease, producing it experimentally in a great number of mice, guinea pigs, hedgehogs, pigeons and dogs. These experiments on the lower animals have served to clear up the nature of the disease, and to suggest a rational treatment, and, above all, a sound system of prevention which no observation of the malady in the human subject alone could have furnished. The physician who neglects such light, and confines his observations to the human patient, is an unsafe guide, whether in the sick room or as a sanitarian.

Hydrophobia—Canine Madness.—Everybody thinks he can recognize a mad dog, and many a poor brute, the victim of an epileptic fit, of a bone in the throat, or even a violent colic, has been hurried out of existence, under the conviction that he is rabid. Even among the medical profession, we find the most injurious blunders on the subject. How often do we read accounts of *hydrophobia* in man as the result of a bite from a dog which is known to be still alive and well. Two weeks ago I was asked to visit a case of this kind, in a boy of eleven years, who was suffering from paroxysms recurring every half hour or three quarters, and of whom it had been decided by physicians that he could not live over twenty-four hours more. One of the paroxysms had just terminated on my arrival, but I found no febrile temperature, no visual irregularity, and no mental susceptibility, such as characterize hydrophobia. His pulse was natural as regards number, but irregular alike in force and frequency, and altogether it was evident that he was a very nervous excitable subject, and the victim of one of those emotional forms of disease so well illustrated by the dancing mania, etc., of the middle ages. During the next three hours, in which the boy's attention was engaged and kept from reverting to his infirmity, there was no return of the paroxysms, and after this, (ten P. M.,) he went quietly to sleep. An enthusiastic student spent each day with the boy for a week, after which the little fellow returned to school happy and well. Many such cases might be described with a less favorable ending, and of which the brains and other structures have been subjected to microscopical examination, as illustrative of hydrophobia. Nor are mistakes on this subject confined to the rank and file of the medical profession. The learned Sir Thomas Watson, in his recent article on this malady, records his belief that "hydrophobia does not ever produce itself." This is a time-honored fallacy, but now abundantly disproved by accidental inoculations of those that attend on the victims and washed their clothing, as well as by the inoculation of animals with the saliva of rabid men. The dangers of such blunders and fallacies are too obvious to require comment.

Glanders.—Though known in solipeds as early as the times

inarians on domestic animals, and afterward appropriated for the relief of man.

When we enter on the list of contagious and parasitic diseases, we are at once brought face to face with a sanitary question of supreme importance alike to man and to his living possessions. Several of the specific and contagious diseases of animals are communicable to man, with a more or less deadly effect. Many, also, of the parasites of animals inhabit the human body as well, and the result of their entertainment is not unfrequently fatal to the human bearer. As both the contagious and parasitic diseases are propagated by germs produced in countless numbers in the body of the victim, it follows that the aggregation in a limited area of men and animals, in which they can live and increase enormously, enhances the danger to both kinds of victims. If physicians are left ignorant of the affection in the beast, and veterinarians of the same in man, they each miss the golden link which would reveal the true nature and dangers of the disease, and enable them to contend with it successfully.

SPECIFIC DISEASES COMMON TO MAN AND ANIMALS.

Without entering extensively upon the subject, I will note a few of the more fatal diseases in which men and animals reciprocate:

Asiatic Cholera.—The implication of domestic and wild animals in this disease, has been extensively observed: In India, by Annisley, Tytler, Jamison, Searle, Chalmers, Rankin, Orton, Barrand, and others, and in Europe by Jænichen, Kleinert, Cohen, Hensinger, Carrere, Hildebrand, Hering and Dick. Recently Thiersch, Burdon, Sanderson, Crocq, and others, have investigated the disease, producing it experimentally in a great number of mice, guinea pigs, hedgehogs, pigeons and dogs. These experiments on the lower animals have served to clear up the nature of the disease, and to suggest a rational treatment, and, above all, a sound system of prevention which no observation of the malady in the human subject alone could have furnished. The physician who neglects such light, and confines his observations to the human patient, is an unsafe guide, whether in the sick room or as a sanitarian.

Hydrophobia—Canine Madness.—Everybody thinks he can recognize a mad dog, and many a poor brute, the victim of an epileptic fit, of a bone in the throat, or even a violent colic, has been hurried out of existence, under the conviction that he is rabid. Even among the medical profession, we find the most injurious blunders on the subject. How often do we read accounts of *hydrophobia* in man as the result of a bite from a dog which is known to be still alive and well. Two weeks ago I was asked to visit a case of this kind, in a boy of eleven years, who was suffering from paroxysms recurring every half hour or three quarters, and of whom it had been decided by physicians that he could not live over twenty-four hours more. One of the paroxysms had just terminated on my arrival, but I found no febrile temperature, no visual irregularity, and no mental susceptibility, such as characterize hydrophobia. His pulse was natural as regards number, but irregular alike in force and frequency, and altogether it was evident that he was a very nervous excitable subject, and the victim of one of those emotional forms of disease so well illustrated by the dancing mania, etc., of the middle ages. During the next three hours, in which the boy's attention was engaged and kept from reverting to his infirmity, there was no return of the paroxysms, and after this, (ten P. M.,) he went quietly to sleep. An enthusiastic student spent each day with the boy for a week, after which the little fellow returned to school happy and well. Many such cases might be described with a less favorable ending, and of which the brains and other structures have been subjected to microscopical examination, as illustrative of hydrophobia. Nor are mistakes on this subject confined to the rank and file of the medical profession. The learned Sir Thomas Watson, in his recent article on this malady, records his belief that "hydrophobia does not ever produce itself." This is a time-honored fallacy, but now abundantly disproved by accidental inoculations of those that attend on the victims and washed their clothing, as well as by the inoculation of animals with the saliva of rabid men. The dangers of such blunders and fallacies are too obvious to require comment.

Glanders.—Though known in solipeds as early as the times

of the ancient Greeks and Romans, this disease was only observed in man in the beginning of the present century. Then it was first recognized by Waldinger, of Vienna, and as attention was attracted to the subject, his discovery was soon amply confirmed from every side. What frightful sufferings and horrible deaths had resulted, at all times and in every part of the civilized world, before the discovery that man owed this disease to the domestic animals, can never be revealed, but from the number of cases reported on all sides, as soon as Waldinger's discovery became generally known, a very high mortality can be safely inferred. Here again we have a terrible example of the loss sustained by the disassociation of human and veterinary medicine. The criminal negligence of our State Legislatures to enact laws forbidding the use or exposure of animals suffering from this and other fatal disorders, contagious to man, may be in part charged on the apathy of the medical profession on the subject. The natural result has followed; many of our large cities swarm with glandered horses, which are habitually sent to the country for treatment or change of air, and severe losses are entailed in many localities. What is more to our present purpose, human victims are not unknown, one such having just come from under my notice, because the attending physicians honestly acknowledged that they knew little or nothing of the malady.

Tuberculosis.—Modern research, mainly in the hands of veterinarians, has established the fact that tubercular consumption is a specific and communicable disease, conveyable from animal to animal not alone by inoculation, but by feeding upon the fresh and even cooked products of the disease. Here again is a subject which has proved a battle-field for centuries for the medical men, has been definitely settled by a reference to comparative pathology, and by instituting a series of observations and experiments on the domestic animals. The importance of this discovery of the communicability of tubercle to animals and man, cannot be overestimated, and speaks with trumpet-tongue of the value of comparative pathology to the physician and veterinarian.

PARASITIC DISEASES IN WHICH MEN AND ANIMALS RECIPROCATE.

Diseases due to parasites, harbored by man and animals, are far more numerous than those dependent on specific disease poisons. We cannot here enumerate the whole, but must hastily refer to a few only of the more redoubtable.

Malignant Pustule, Malignant Anthrax, Anthrax Mycosis, Anthrax Baccihis.—This is one of the most anciently known of diseases, being almost certainly that which cut off the Egyptians and their cattle in the days of Moses, and that which swept down the Greeks and their live stock at the siege of Troy. Through the middle ages its ravages were frequent and extensive, the destruction falling with equal impartiality on man and beast. In the agriculturally undeveloped steppes of eastern Europe and Asia, such wholesale destruction occurs as a matter of to-day, and in our own Southern States severe losses are often sustained. Even in the North it is far from uncommon. I have known as many as fifty perish from a single herd in two weeks. Doctor Bell records the occurrence of the disease in an equal number of human beings, within a few years, and many of them in Brooklyn City Hospital. I am further acquainted with a number of isolated attacks in man, caused by inoculation from the diseased animal. Here, again, in several cases, the attending physicians failed to recognize the disease, on account of their want of acquaintance with the pathology of animals. We now know, from investigations conducted on animals, that this affection depends on the presence in the system of a vegetable parasite, a special development of a fungus, (Bacillus Anthracis,) which maintains its infecting properties only at a particular stage of development, but may be preserved for an indefinite length of time in buildings, yards, fodders, soil, and grasses, as well as in the dead bodies and other products of the diseased animals.

Milk Sickness.—According to Dr. Phillips, this disease is also due to vegetable fungus, which conveyed to man, in the products of the living or dead animals, produces a profound nervous prostration, with impairment or suspension of nearly all of the vital functions, and in many cases death. As the disease is produced in man mainly by the consumption of butter and cheese, and as

these products from infected localities are likely to be sent to a distance, it seems probable that cases of milk sickness occur, especially in the large cities, without any recognition of its true nature. A thorough course in comparative pathology would enable the physician to recognize these more readily, and to interdict such dangerous articles of food, through the agency of the city boards of health.

Vegetable Parasites on the Surface.—Of other vegetable parasites there need only be mentioned those productive of the different forms of ringworm, all of which exist in the domestic animals, and those causing thrush in the mouth of young animals. If the practitioner, medical or veterinary, is unacquainted with the habits of these parasites on animals and vegetables, he is not likely to prove a satisfactory sanitary adviser, however successful he may be in destroying the parasite in the individual case.

Entozoa.—Of entozoa or worms, man reciprocates with the domestic animals in entertaining at least six different species of *tapeworms*, some of them like *echinococcus*, productive of much suffering, and a fatal result in many cases; of one *trunatode* or *fluke*, and of three *round worms*, including the deadly *trichina*.

Epizoa.—Of animals that live on the surface, no less than a dozen species are common to man and the domestic animals, and though these are not usually dangerous to life, yet they will, in some instances, prove most inveterate and indestructible, and condemn their victim to a most miserable existence.

This hurried and imperfect notice of the maladies common to man and animals will serve to illustrate how much is lost by the separation of the two fields of medicine, human and comparative. If the above remarks have seemed to reflect unduly on the average medical practitioner, it is in no invidious spirit, but only because the object of the present paper is to show how much the medical profession may gain from a closer association with comparative pathology, and especially with veterinary medicine. Such a connection would accrue even more to the profit of the veterinarian, alike in giving him the status that he ought to possess, and in furnishing him more thoroughly for the practice of his profession. The average veterinarian is, to say the least, no better in-

formed on many of the points referred to than is the average physician, and broader views and sounder practice will come to both from the mutual cultivation of that field which is common to both. This is already recognized in the best medical schools of Continental Europe, and by their chairs of comparative pathology, filled by accomplished veterinarians, they are seeking to reap the advantage. England has recognized the same truth in associating with the Brown Institution—an endowed hospital for sick animals—a department for experimental research in comparative pathology, and a lectureship on the same subject. Oxford now follows suit in an endeavor to establish, within her academic shades, a chair of comparative pathology.

If we turn from physiology to the pathological action of medicines, the basis of all rational therapeutics, we find that here too a solid ground-work is laid in a careful observation and experimentation on animals. Take up any large work on therapeutics, and you find that nearly every drug has been thoroughly tested on the lower animals, and that its various known physiological effects have each been determined by such experiment.

Doctor Bell Pettigrew puts the case forcibly but thoughtfully, when he says: "No one can intelligently administer medicine to a human patient who is ignorant of the effects produced by it on the lower animals. A perfectly educated physician should also be master of the veterinary art."

Another eminent medical writer remarks: "That men should confine themselves to curing what they are pleased to call the lower animals to the exclusion of mankind, and the reverse, I cannot, and never have been able to understand, and I hope the day will soon come when he who medically treats mankind, may be looked upon as a dangerous specialist, if he has not attained his position by a comprehensive study of the diseases of the lower animals. That the sister study of human medicine should recognize the advantage of a knowledge of comparative anatomy and physiology, and overlook the vast and unspeakable advantage of a knowledge of comparative pathology is really inconceivable."

The London *Medical Examiner*, in announcing a department of *comparative pathology* in its columns, makes the following very

true remarks: "As much of our exact knowledge of the phenomena of healthy life, or physiology, has been obtained by observation on the lower animals, true scientific pathology, or a knowledge of the phenomena of disease, must be based upon the study of diseases and morbid processes occurring in other animals besides man. It is a recognition of this fact that has led to the proposed establishment of a chair of general and comparative pathology at Oxford, a university which has been foremost in promoting the science of biology. There are many reasons why animal pathology and medicine should precede or accompany the study of human medicine. Living under more simple conditions—conditions more approaching those of nature—the transition from a state of health to a state of disease is more easily traced, and diseased processes are more simple in the lower animals than man. The student of animal pathology and medicine is able to command the circumstances of disease to an extent quite unparalleled in the case of man. Both the individual and his environment are to a greater extent under the control of the observer, and by varying the condition of life he is able to modify the course of the disease. There is thus afforded to him an opportunity of calling into play, of varying or of removing the conditions which appear to produce disease, and thus to determine the essential factors of morbid processes. In the human subject one of our greatest difficulties is that conditions cannot be repeated or varied at will, and thus arises the uncertainty which hedges in the study of medicine, however indefatigable and sincere may be the student. Again, in the lower animals morbid processes can be studied in all stages of their progress, for the victim of disease can at any moment be destroyed. In this way essential and early changes can be differentiated from those which are secondary and mere complications. It is the privilege of our office to prolong human life to the utmost limit, and hence we are unable to employ the scalpel and the microscope, or the test tube to the dead body, till such time as the original morbid processes have become greatly obscured, if not completely effaced. Such knowledge is necessarily one-sided; for by studies prosecuted on the dead, we are often unable to discover the subtle and delicate point on which is

suspended the brain, oscillating between recovery and death. It is in the domain of preventive medicine, however, that we have most to expect from veterinary medicines. Here the scientist is not only able to indicate the measures necessary for the suppression of disease, but can get legislative authority for enforcing them. From knowledge gained in this department, we shall be able to apply the remedies necessary for the prevention of human diseases."

"Many of the greatest achievements in physiology, pathology, and therapeutics have been gained in the sphere of the veterinary physician by students and practitioners of human medicine. The more advanced position of human medical science explained this anomaly in former times. But now veterinary medicine has emerged from the empirical to the scientific stage; and the veterinary profession will be expected to contribute more and more to the knowledge of our science and art. The training of the veterinary practitioner is daily becoming more comprehensive and more careful, and the fruits of this are seen in the rapid advances of veterinary science, and in the culture of those engaged in veterinary medicine and surgery. Veterinary literature has made enormous progress during the last few years, and the most brilliant future may be predicted for it. Now that veterinary medicine has been established on a scientific basis, the time has come when the bonds that unite the students and practitioners of human and veterinary medicine should be knit more closely, and the two branches be brought into more intimate relationship. Human and veterinary medicine are progressing along the path of knowledge, but they are separated from one another. Fellow-travelers along the steep and rugged course, they should advance hand in hand, helping each other to surmount the obstacles they will have to encounter on the way. Each has much to learn of the other. While the objective side of disease is often studied to the greatest advantage in animals, the subjective can be studied in man alone. It is, therefore, no less necessary for the veterinary physician to have a knowledge of disease in man, than it is advantageous for the practitioner of human medicine to study diseased processes in the lower animals."

This last remark is suggestive of the true remedy for the present undesirable state of things. Both branches of medicine suffer from separation. Each is necessary to the rapid progress and highest advancement of the other. The obvious necessity is, that both should be taught in the same institution. While this will secure breadth, fulness, and soundness in the instruction, it will attain still another desirable end—the teaching of both at a cheaper rate. Much of the ground gone over by the student of human medicine must also be covered by that of veterinary medicine. Many subjects may, therefore, be taught to a large mixed class of students of those two branches, thereby saving the time and expense of two teachers, while the increased numbers and greater resources will enable the institution to make this one course much more effective than any two such courses, delivered by different men, in distinct colleges, and with less perfect appliances. It is only when the medical and veterinary students enter on the study of those subjects which are peculiar to the practice of the two branches of medicine and surgery, that they must study in distinct classes and under special teachers.

Before leaving this subject, one other remark on the words of the *Medical Examiner* is demanded. The full advantage to the medical profession from association with the veterinary, is only to be obtained by the experimental investigation of disease. In practice, the veterinarian has rarely any advantage over the physician of man, in the power of sacrificing the sick in the interests of science or of changing the environment and conditions of life. To avail of this, provision must be made for a certain expenditure for experimental purposes, and any such outlay with competent scientific supervision, must prove of the greatest advantage to both physician and veterinarian.

ADVANTAGES OF THE DOUBLE QUALIFICATION (MEDICAL AND VETERINARY) TO COUNTRY PRACTITIONERS AND THEIR PATIENTS.

The association of human and veterinary medicine in one educational establishment would render it easy for young men looking forward to a country practice to extend their curriculum, so as to secure degrees as "human" and "animal" physicians.

The double practice would, in many cases, add largely to their emoluments as well as their usefulness; their employers would esteem them all the more highly that they could turn to them with confidence to prescribe for their valuable stock, as well as their sons and daughters, while to the physicians themselves would belong the enviable distinction of conservators of the lives and fortunes of the community. In many districts where two professional men, medical and veterinary, could scarcely subsist, one with the combined qualification would make a good livelihood. If properly educated, he would prove a sounder guardian of human health, from his acquaintance with the diseases of the dependent animals, and he would be a safer veterinary physician for his extensive acqaintance with the pathology of man. His better position and more abundant resources would enable him to keep up with the times, and to avail for his employers of the most recent advances in pathology, therapeutics and sanitative, so that the dweller in the remote country districts could have nearly all the advantages of the denizens of the city. Finally, the practitioner would have the uncommon advantage of a most extended field of observation, and not only would he be enabled to add many new facts to pathology, but he might gain a breadth and soundness of erudition, that would, in some cases, especially fit him to be a teacher of the science.

In advancing such a proposition as the above, I by no means advocate that the simple physician should encroach on the sphere of the veterinarian, or the veterinarian on that of the physician. It is a matter of common observation with veterinarians, that when a physician prescribes for his own horse, he is as likely as not to blister the shoulder for a lameness due to disease in the foot, or to give a few grains of tartar emetic, which would be entirely inoperative on the equine system. So with the veterinarian, in prescribing for his own family, he is stepping out of his sphere, and is likely to act detrimentally, rather than beneficially. For this new field, I propose a new style of practitioner, more comprehensively educated and equipped than either physician or veterinarian—one who has given a longer time to acquire his education, who has earned both degrees by faithful and conscien-

tious study, and who, in the hospitals for men and animals, has made himself thoroughly acquainted with the diagnosis and treatment of the maladies of man and beast. In many sparsely populated districts, a practitioner of this kind would be a most desirable acquisition, while in the cities and densely peopled localities, specialists must continue to pursue human and veterinary medicine, surgery, ophthalmology, otology. gynæcology, dentistry, &c., &c.

VETERINARY PRACTITIONERS NEEDED IN THE UNITED STATES.

There is no means of ascertaining the number of educated veterinarians in the United States, but it may safely be affirmed, that nearly all such are confined to the large cities. In the country districts, where the greatest and the most valuable part of our live stock is to be found, they are few and far between. In the absence of these data, we may estimate the number of live stock of our own and other countries, and deduce from this the requisite number of veterinarians. Great Britain, which stands low in the European scale, as regards veterinarians, owns over forty-two millions head of live stock; and not much less than two thousand veterinarians. If, however, we cut off sheep and swine, for which the English veterinarian does little or nothing, we find but three millions nine hundred thousand head of horses and cattle, or more than four thousand for every veterinarian in the country. The ratio adopted in the calvary, of one veterinarian for each regiment of one thousand, would necessitate a four-fold increase of the profession.

Turning to the United States, we find over one hundred million head of live stock, or if we cut off sheep and pigs, we have still left over thirty-nine millions horses and cattle, very nearly five times the number found in Great Britain. If, therefore, Great Britain requires two thousand veterinarians, we require no less than eight thousand, or if we were to estimate according to the number supplied to the British army, we would swell the number to thirty-nine thousand.

The following tabular arrangement will present very forcibly the needs of the United States, as compared with Great Britain.

	United States.	*Great Britain.*
Horses, asses, and mules, ...	11,149,800	2,790,851
Cattle, ...	27,870,700	6,115,491
Total horses and cattle, ...	39,019,500	8,906,342
Sheep, ...	35,935,300	31,313,941
Swine, ...	25,726,800	2,422,830
Total live stock, (except carnivora,)	100,681,600	42,643,113
Veterinarians, actual, (probably,) .	200	2,000
Veterinarians needed in ratio with live stock, ...	4,762	
Veterinarians need in ratio with British Calvary, ...	39,019	

It is perhaps an extravagant estimate to set our needs down at four thousand seven hundred and sixty-two, or one veterinarian to every twenty thousand head of live stock; though if these could be collected within a reasonable area, we would find more than enough to do in attending to their health. The objection is not want of practice, but the fact that in many places the stock is scattered over such a wide district, that it would not pay the veterinarian to visit them at rates, which the interests of the stock-owner could allow. If, however, we could furnish such districts with practitioners having the double qualifications, they could find within a reasonable area a sufficient number of patients to make it worth their while to stay, and worth the people's while to employ them. One such practitioner to every two hundred square miles is surely a very modest estimate, and this would give us considerably over five thousand in the States of the Atlantic slope.

VALUE OF VETERINARIANS TO THE COUNTRY.

The value of the present services of veterinarians in the United States must be a very meager sum comparatively to what it might be if veterinary science were availed of as it ought. Some estimate of the value of a scientific veterinary supervision, may be deduced from the fact that prior to 1836, the losses in the French cavlary amounted to one hundred and ninety per

one thousand per annum, but the veterinary care has reduced this of late years to sixty-seven per one thousand yearly. In the English cavalry the record is far better, and largely because a superior stable accommodation has been secured. Colonel Sir F. Fitzwygram, himself a veterinarian, in a recent lecture, gave it as the result of his experience, that veterinary sanitary science had reduced the loss of horses in the English cavalry regiments to a minimum, and the annual "casting" of horses to ten per cent; giving an average service of ten years to each horse carrying two hundred and fifty pounds on its back, at a rapid pace, over rough ground. The same authority recently mentioned an instance in which the supervision of a veterinarian led to a yearly saving of $30,000 in a shed of four hundred hard working horses. An instance almost as striking occurred in the practice of a friend of the present writer, in charge of the horses of a large colliery company in Durham, England.

But it is in the department of *sanitary or preventive medicine* that the value of the work of the veterinarian is the highest. Ordinary diseases of animals carry off isolated individuals only, and the full measure of the loss is in every case seen and appreciated at once. One case of sickness or death brings no danger to the other stock, and the owner can, in any case, estimate whether he can better afford to lose his property than to incur expenses for medical treatment. But with animal plagues, the first case of illness is pregnant with a mighty and ever increasing danger, not only to the other stock of the same owner, but to all the live stock of the nation, and even in some cases to the citizens as well. Taught by the bitter experience of many centuries, the separate nations of Europe now avail of veterinary science to save them from yearly losses of millions of dollars by animal contagia. A country like England, which has been beguiled into a false sense of security, by its comparative isolation, and that has failed to avail of this modern science, has been drained of $40,000,000 in one and a half years by one plague, and of a regular tax of upwards of $15,000,000 per annum by another.

Coming to our own land, we find a loss by one plague of swine

in a single year, (1876,) of no less than $20,000,000. It is the province of veterinary science, acting with government authority, to attempt the extinction of this plague, and there can be little doubt that at a small expense comparatively, this malady may be crushed in the bud in whatever locality it may show itself. Beside our other indigenous plagues and parasitic diseases in domestic animals, we are continually threatened with foreign animal contagia, against which we have no reasonable protection. The present treasury orders on this subject, admit all "*blooded*" animals on the strength of a consular certificate of soundness, which is only equivalent to a free invitation to animal diseases in general. The only safe position to occupy in this matter is that of a careful examination of every imported animal by a veterinarian, of a quarantine under veterinary supervision, and of such a duration as will exclude the possibility of the dreaded disease being harbored by the subject, of a thorough disinfection of the surface of the imported beast, and of all articles used about it, and finally of the systematic destruction of all fodder and litter imported with such animal. The limited character of our importations of live stock, would allow of such restrictions without any perceptible injury to commerce, or to our national prosperity; and the ever threatening dangers against which they would secure us, are in their nature almost illimitable as to extent and duration. The most insidious, and therefore the most dangerous of all cattle diseases, (*lung fever*,) we now harbor in our midst, and while it makes slow progress owing to the opposing current of cattle traffic from the west, and the want of temptation to transport our common eastern cows into the cheaper western herds, yet it is steadily encroaching on new territory, and now numbers its victims among several high class herds. Any day a bull from one of these thoroughbred herds may be sent west for the improvement of the native stock, and may thereby introduce this disease into our unfenced stock ranges, when it will be practically impossible to eradicate it. The same malady imported into the open stock runs in the Cape of Good Hope and Australia, swept the herds off in a rapid destruction, and successfully resisted all efforts to extinguish it. The same holds good with this and other plagues on

the open steppes of eastern Europe and central Asia. There, animal plagues in general find a perennial home. From these the best directed efforts of a thoroughly equipped sanitary commission have failed to eradicate them, and against these eastern plagues the adjacent European nations can only protect themselves by a most elaborate and expensive system of frontier inspection and quarantine, which is paralyzed on the occasion of every great war, and occasionally even circumvented by smuggling and corruption, with the most disastrous effects to the western countries.

Our cattle traffic from the west and south is so extensive that any efficient system of examination and quarantine, sufficiently extended to exclude this disease, would be impracticable, as the trade would be thereby completely suspended. Since, therefore, the trade must go on, the inevitable result of the infection of our western stock-runs will be the infection of our eastern States throughout, and a yearly loss which can easily be estimated by the corresponding loss in Great Britain, from the same disease, since its importation, in 1842. Since that time Great Britain has lost in deaths alone, from this malady, on an average, $15,000,000 per annum. This, it will be remembered, is on a stock of six million head, from which fail to be deducted the great herds of black cattle bred in the highlands of Scotland, which have hitherto escaped infection, owing to the absence of the importation of strange beasts into their midst. Taking the same ratio, without this deduction, for our twenty-eight million head of cattle, our general infection would lay us under tribute to the extent of $60,000,000 per annum. Or if our herds increase at their present rate, our losses, by the end of the century, would amount to a yearly total of at least $120,000,000.

This it is the province of veterinary science to save to the country, by crushing out this most insidious and fatal malady, while it is still confined to the enclosed farms of our eastern States. At present this can easily be accomplished by sound and rigidly enforced veterinary sanitary laws. If the United States decline to avail of these, the sad truth of the above mentioned representations will burst upon them with overwhelming force on some, perhaps, not distant day, and they will vainly turn for help to the

long neglected science of veterinary medicine, at a time when it can no longer offer a perfect protection.

We have just had an instructive instance of the disastrous results of neglecting the warnings of science in the case of the invasion of the *potato beetle*. Professor Riley warned the nation of the great losses that would result from its eastward progress, and showed how, by the outlay of a few thousands, it might be prevented from crossing the Mississippi. Instead of heeding his advice, the Missouri government, in a fit of blind retrenchment, abolished his office of State Entomologist, thereby effecting an immediate saving of $3,000 a year, while the *potato beetles*, allowed to cross the river, at five separate points only, have laid the eastern States under a contribution estimated at $100,000,000 per annum.

Even more disastrous would be the acclimatization of the *lung fever* in the western States and Territories. Hence the urgent necessity that the country should foster veterinary sanitary science, and avail of it to obviate such a catastrophe. So, too, with regard to other animal plagues, indigenous and foreign. But to accomplish this in the best and cheapest manner, in a thinly peopled country like the United States, we must have the new style of practitioner, of human and veterinary medicine, and hence the surpassing importance of medical schools in which both will be taught in the most thorough manner. It speaks well for the advanced and far-seeing views of the faculty of the University of Pennsylvania, that they are the first among American institutions of learning to have recognized the importance of this alliance between the two sister professions of medicine, and it is to be hoped that the Legislature will prove themselves equally liberal and true to the best interests of the country in providing the means for a firm and permanent consummation of the union.

CORRESPONDENCE.

HYDROPS PERICARDII.

By E. F. Thayer, V. S.

On Monday last, at twenty minutes past eleven o'clock, I was called to see a horse belonging to Messrs. Blanchard & Atkins, of Newton. On examination I found the animal suffering considerable pain, although not of a violent character; the head was depressed, the tongue hanging out of the mouth, occasionally the head was turned towards the abdomen, sometimes to one side, then to the other; apparently there was a desire to lie down, as the hind legs were drawn forward, but he seemed afraid to do so; pulse 60 and full, but not hard. He was then in a stall. On being led into the floor, I attempted to examine the mouth, but was unable to open it, which excited a suspicion of tetanus; an examination of the muscles satisfied me that the apparent rigidity was caused by spasmodic contraction, and soon after the mouth could be easily opened.

As it was evident that abdominal pain was present, I administered an anodyne stimulant; before twelve o'clock, he quietly laid down, and after raising his head and turning it to his side a few times, he remained quiet. I then left him for a few minutes. On returning I found him easy, the hostler remarking, "he is all right."

At the next visit, made two and one-half hours after, he was dead. As the symptoms were peculiar, I requested permission to make an autopsy; on the following day, in company with my assistant, J. S. Winchester, D.V.S., an examination was made. The abdominal viscera was first removed; the general appearance was slightly pale, the liver and kidneys were firm, the stomach contained a fair quantity of food and appeared healthy; on separating the small intestine from the mesentery, about four and one-half feet were found to be of a reddish line; the whole tract was laid open, and with the above exception was in a normal condition. The diaphragm was then removed; the lungs were healthy, the pericardium contained nearly a pint of dark red fluid, the walls and valves of the heart were normal.

Remarks.—The animal had been driven in a grocer's wagon about two months, without showing any symptoms of disease, eating and drinking with almost a ravenous appetite. Three days before the attack he injured his knee, in the stable, it was supposed by getting cast, and had not been worked, which was all the time lost in the two months. The stable keeper informed me that he had known the horse for five years, and that he had been healthy. The fact that the animal had been able to perform the labor required until the injury occurred, and that no evidence of sickness was present until five hours previous to his death, tends to make the case particularly interesting.

WEST NEWTON, May 24, 1878.

AN OPEN LETTER TO WOULD-BE STUDENTS OF VETERINARY MEDICINE IN THE UNITED STATES.

BY F. S BILLINGS.

During the past few months I have had the pleasure of answering several letters from countrymen on the above subject, and as there may be others who are desirous of like information in a more concentrated form than it has otherwise appeared from me, I take this way of gratifying them; at the same time I would earnestly recommend young men desiring to enter the veterinary profession to read the series of papers which have appeared from me in the *Turf, Field and Farm*, and the revision of the Schools of France, which came out in the *Spirit of the Times* of May 26 and June 2, 1877. I am fully aware of the responsibility resting upon me in thus offering advice to young persons in selecting the place by which they are to gain the means of obtaining not only a subsistance, *but a position in the world*, and in a certain sense of the word I leave the question open to the aspirant, for it depends on him, even more than the school, what the result will be.

Before speaking of schools, however, I feel impelled to call the attention of every aspirant who is on the verge of entering our profession, against a danger to which all of us are liable, and which has, I believe, wrecked many a good man, and has been

and is the curse of our existence, and will continue to work against our elevation so long as we exist as a profession. I mean the association with "hoss men," the "talking hoss," loafing around livery stables, having offices or seats or desks, yes, order boxes in such places; knowing the horse we meet, but that does not mean we shall swallow him and sleep with him, it does not mean we must select for associates "horsey-blackguards" of every description. No one need feel anxious that the writer does not intend a practical education as well as scientific. Many a person who reads this knows well enough he has paid dearly for his whitling, and knows of what he speaks. These so-called "horse-men" are unwittingly the enemies more than they are the friends of our profession; they are self-conceited, ignorant, and bigoted; they will quack it until their horses are as good as dead, then send for us, and because we cannot do more than a God, will condemn us and our profession on every side. Beware of them, I say, treat them with dignity and respect, serve them only when called by them, and be sure they will equally well respect you, and be far more likely to call you in, as they learn to respect you, than they have in times past. There is the sharpest distinction between the "horse-man" and the intelligent lover of the horse and other animals, the educated breeder or the educated or intelligent farmer. Seek the latter; shun the former.

From my writings it is self-evident that I shall not advise any one to try the schools of Britain; they are poor, except practically, and give a man no scientific foundation, or other collateral education and stimulus by which he will be enabled to rise in the world. In plain English, they make Routiners—nothing more. These schools are fully as expensive as those in America, and the student is overloaded with examination fees, and has to find the animals for his anatomical studies at his own expense; further, the expense of living at the capital of England is certainly not much less than in other large cities. Of the American schools, the aspirant can inform himself. I should certainly not recommend either of them to any one who has *means* and *will* enough to undertake the course at one of the best continental schools. One thing, however, I will not pass by without notice; in certain

quarters, there has been a cry raised against the legality of the diploma given by the American Veterinary College, of which Mr. Liautard is Director. In the first place, that is a pretty noise to make in a land where there are fifty or more medical schools, most of which are nothing more or less than quack-producers. "I haint bin to no Harvard, I kim from Chikaga," said one of these sprouts in my presence some time since. He remained two weeks in Berlin, paid for a series of lectures by Virchows, Laugenbeck, and others, went to Vienna and did likewise, and, by the way of Paris, was home in America in ten weeks. *And had studied in Europe.* It may not be known in America, but the fact is, our national reputation is being daily buried deeper and deeper by these "*sprouts of Americanism*;" every hard-working medical student who is now or has been in Europe can testify to the mortification he too often has to bear, by being asked if he knew Dr. ———. The truth is, all our medical schools are private schools, with this difference: If a father sends a son to a common private school to be *educated*, he ascertains if it be good; if he sends him to a medical school he *wants him put through;* this is American. All medical schools in our country, whether organized under a general law or a special law, are dependent on the character of their teachers and their graduates for their reputation; and the veterinary schools are no different. The "*no charter*" of the one is better, to my mind, than the "so-called charter" without State inspections or responsibility, of the other. The thing can very well be compared to the *liquor laws*; on the one side we have a man selling liquor, giving good wares, doing the best he can, because he values his reputation; he does business under a general law, which requires a man to be honest and do his duty. On the other side, we have persons doing business under a special law, but the law does not say how they shall do it, or guarantee to the public the quality of the article they shall receive. Such a law is self-evidently a dead law, and the charter far worse than no charter at all. The V. S. of the one is fully as good as of the other; the question of instruction remains for the aspirant to satisfy himself.

Of the veterinary schools of France, I would say a few words.

The course is four years, of two terms each of about five months, making nearly ten months a year study. These schools are eminently practical; they place immense stress on the value of anatomy in all its forms, and also give great attention to operative surgery, and are admitted to be the masters in these two branches by nearly all Germans. The balance of the education is good, and there is no doubt that a person going to either Alfort or Lyons will be an intelligently educated man and fine practitioner, and further, will gain much collateral information of value. The cost is, I think, 200 francs ($50) per year. With an examination fee, the student will find every opportunity to study, and abundance of anatomical material free of extra cost. I can but cheerfully recommend these schools to my countrymen, and to one desiring only a first-class practical education, with a fair basis, there will be no disappointment.

I come now to the more difficult part of my task, the schools of Germany, or rather the school at Berlin. I say more difficult, because whether a man proves a success, finds himself fully satisfied, depends infinitely more upon the *man* himself at Berlin, than at the French schools. I have above recommended the man desiring a really practical education to go to France, and I warn any one who is not a natural-born horseman, and who has had some experience in such matters, or who cannot apply a bandage with all the skill of a Mace or Woodruff, either to learn it first, or not to come to Berlin, unless he intends to go to France afterwards; for that part of our art, which can be called clinical handiness and skill as well as horsemanship, is not only foreign to the Berlin school, but foreign to the nation. On the other side, to the man to whom these things are natural, (and what man in America would think of entering our profession to whom they are not?) or to one who feels himself confident of acquiring them; and furthermore, to one who desires a truly scientific education, who is burning over with ambition to enter into the "holy of holies," and to become more and more acquainted with the hidden processes of animal life; to one who desires to gain the spirit of this glorious and advancing German method, which is conquering the world, to him I say, Berlin offers every opportunity, except one, and

that is in anatomy. Aside from this, there are the immense advantages offered by the schools of medicine of the Berlin University. I have said Berlin offered poor advantages in anatomy. This disadvantage is very much dependent upon the student coming here; it lies in an insufficient supply of material in proportion to the number of students; but the *Professor* having this branch is an exceedingly accommodating man, and if one does not feel abashed and *will have* what he needs, the old adage will prove true here as well as in other things, "where there is a will there is a way." I, myself, found no want of subjects, but a young American friend of mine here has seriously suffered during the winter for the want of sufficient *energy*. But there is another way to overcome this difficulty at Berlin, and a very agreeable one. Prussia has another school, a small affair, at Hanover, where the number of students is small, and amount of material large. Over this school is Prof. Guenther, whom I sincerely believe to be the best hippotomist living. His anatomy, both demonstrative and topographical, is said by everyone who should know, to be something exceptional. The expenses here would be no more than in Berlin, and the student would have credit for his year's work, and could take the second winter in Berlin in anatomy. Another excellent plan is to take the first three sessions of the French schools, and the last four of that at Berlin; but although this would be allowed, I hardly think it so advantageous or so cheap as to take the German schools first, and then a short visit to those of France, for the experiences of the three-and-a-half or four years in Berlin, would make more manifest and valuable the special superiorities of the French schools. The clinic of the school at Berlin is probably as rich in abundance of material and richer in variety than any in the world, the "Droscke" horse of Berlin having more ills and a greater variety than any animal of his kind it has been my fortune to become acquainted with; a South American or Mexican jackass lives in heaven compared to his unfortunate relation in Berlin.

The term at Berlin will be from October, 1879—3½ years' actual study; the examination will take place during the course of the eighth session, making in reality eight sessions, for one

will naturally attend lectures when not busy with examination. The cost is 100 marks ($25) per year, and includes everything. The Berlin schools offer advantages in physiology, histology, and pathology not equalled by any others. I take it for granted, that in other things except those mentioned, the education is about the same in France and Germany—such as obstetrics, chemistry, physics, zoology, &c. As to admittance at Berlin, or to any other German school, the Direction waives any matriculatory examination for foreigners, assuming no man would take such a venture who was not fitted, as they will not be so liberal about letting one out. It must not be forgotten by the American, that this is a military institution, the rules and regulations of which resemble those of the Medes and Persians, alluded to in the Bible. As to getting out—that is, obtaining a certificate of examination, signed by the German Minister of Agriculture—that will depend entirely upon the student himself, for they do not agree to allow a foreigner an examination unconditionally; the student must show himself worthy, and win the esteem of his teachers by unceasing diligence and manly conduct, and then he will have no difficulty about being recommended to the Minister and obtaining an examination—all will depend upon himself. I have no doubt that admission can be gained to the French schools on like terms, but Mr. Liautard can inform the inquirer better than the writer; one thing is sure, they are the only ones which will allow a graduate of another school to make an examination, without having previously studied a year with them—this is a true international scientific spirit. No person can exist and do good work in France or Germany at less than $700 per year; and it is my opinion, judging from the experiences of an English V. S. who is now studying here, that the expense will come nearer $1,000 per year, and I cannot recommend any one to undertake this experiment who cannot have $4,000 at his command. One thing I dare not pass over, and that is that the temptations of Berlin, to a young and homeless American, are something exceeding anything *any* American city can offer. A student is absolutely encompassed by "Bier und Frauenzimmer," and no parent should allow a son here under 20, unless sure he

had moral backbone, enough, at least, to save his health and understanding. A student must be 18 years old to gain entrance here or in France.

To any one who has read my papers, it will be evident that I am an active opponent to learning the *elements* of chemistry, physics, geology, zoology, and botany, in a school where veterinary medicine is to be studied. There are no words to express the earnestness with which I would implore Americans desiring to take either a French or German course, to fit themselves carefully in these things before coming here, and bringing certificates with them of the grade of knowledge they have attained. I beg such young men to enter such a school as the Lawrence, or other scientific school, and to seriously apply themselves to these things for at least eighteen months: to chemistry, in a laboratory—all other is useless; and as to botany—the genuine elementary botany; that is, the true cellular development of theories and phenomena of plants—with this well learned, animal anatomy in its fine and coarse forms will be but play. He should naturally be thoroughly at home in analytical botany, and also in the classification and characteristics of the animal kingdom. The general principles of comparative anatomy, he will find taught in an exceptionally fine manner in Berlin. It should be self-evident to the American who is going to undertake this venture, how much such a course will spare his health and mind; but to make it fully evident, I will call to his mind the fact that, in his first year, unless he does this, he will not only have to *learn* vocabularies in five different studies, and become at home in their technicalities, but will have to learn *them* also; whereas, by the above course, he has only the language and the words to learn; and, being at home on the subjects, the words would almost come of themselves by hearing the lectures, without any extra study. He can then give his whole force to those essentially professional, and not on himself, upon these side branches.

I must again say, that no one need come here thinking he will get through any easier than a German; and to enable him to do well, I have advised him fitting himself in a way which will more than equalize the difficulties of a foreign language, for I take it

for granted, that no American will undertake this European venture who is devoid of national pride, or who would not desire to do honor to the American name; for those of our countrymen who have studied in other branches here for a length of time, have unexceptionally honored their country. One must see that *our profession* does not fall behind in this matter.

A few words on the books necessary to bring here. Our Goverument having, in the supreme wisdom of the Solons who constitute it, *placed a premium on ignorance* by placing a high duty on all foreign books liable to contain fresh truth and worth more than one dollar, for the benefit of half a dozen publishers and the injury of every man hungering for knowledge, it is self-evident that one intending studying in England or Europe will spare himself all unnecessary expense. When one reads such laws, he can but reflect, Have these men who made them forgotten how they worked to gain knowledge in their youth? If they have not, then such legislation is not only *heedless* but *headless*. A duty on knowledge! Is there another country so fallen? The "silver craze" is wisdom in comparison thereto. The only book an American need bring with him is "Dunglison's Dictionary of Medical Terms." The only German-English dictionary which is worth using to the student of medicine or chemistry, is Lucas', and costs, elegantly bound, in Germany, $7.00. As an example of the correctness of my assertion, in Germany "Williams' Veterinary Works" cost $7.25, in United States $10.00 per vol.; "Sidney's Book of the Horse," cloth, in the United States $12.50, in Berlin 30 marks ($7.50). Brains are not at discount in Germany, or knowledge taxed, if almost everything else is.

If there is anything which an intending student desires, not mentioned here, the writer will cheerfully answer on application by letter.

KÖNGLICHE THIERARZINEE SCHULE,
Berlin, April 13, 1878.

EPIZOOTIC PLEURO-PNEUMONIA.

In Mr. Michener's article in this month's REVIEW, on the above-named disease, occur the following statements:

"I say seems to be restored; for in almost every case of this kind we find, on a careful examination, more or less diseased condition of the lungs, which is present in a latent form, but only waits the proper stimulus to make it the nucleus of a contagion which may infect whole neighborhoods and bring about all the terrible calamities resultant on such outbreaks." And "Cattle once infected should not be kept for any purpose, but if kept should remain apart from all others until fat enough to kill, and be disposed of in this manner."

Now, in the first place, to what does he refer as being pres en in a latent form, and what would he consider a proper stimulus to make such a subject the nucleus of contagion? And secondly, why does he recommend that cattle once affected should not be kept for any purpose, but if kept why so isolated from other cattle?

His experience may enable him to explain these points to the edification of other members of the profession, as well as to

Yours, respectfully,

L. McLean, V.S.

Brooklyn, June 18, 1878.

REPORT OF CASE.

REMOVAL OF THE LEFT INFERIOR MAXILLA.

By C. D. Smead, V.S., Logan, N. Y.

Read before the Rochester Veterinary Medical Association.

I send you a report of a case that I operated upon by way of experiment, which proved a success, although at the time I had but little or no hope of its terminating so well, and I will say, at the beginning, that I claim but little credit, as the operation was quite simple; and I attribute my success wholly to nature's power of reproduction of bone. On the 22d of July, 1877, I was called to the farm of Peter Swartout, in Lodi, Seneca Co., to see a colt about four months of age. I found the tongue of the

animal very much swollen and protruding from the left side of the mouth. The owner said that the first he noticed wrong, was about three weeks previous, when a considerable swelling appeared on the left cheek; but the swelling nearly all went away in a few days, and he thought him doing well until four or five days, when he discovered that he had great difficulty in nursing from the mare and a very unpleasant odor in his breath.

After casting and securing the colt, I proceeded to examine the mouth, first pushing the tongue back into the other side of the mouth, as he had but little use of it from its swollen and ulcerated condition. I passed my fingers into the mouth, and was somewhat surprised to find the corner nipper of the left inferior maxillary very loose; in fact, so loose that I picked it out with my fingers. I also discovered that the first and second molars were loose, and I also picked those out with my fingers. In passing my fingers into their cavities, I found the maxillary itself in a state of necrosis, and the tissues covering the bone in a putrid condition.

I told the owner that I could give him but little encouragement, but would remove the diseased portion of bone if he wished me to, and see what it would do. As the colt was a high bred one, and very valuable if cured, the owner wished his life saved if possible, even if he was left deformed. I then proceeded to remove that portion of the maxilla from the second nipper to the third molar, which I found perfectly necrossed and had to be removed in small pieces. I then supposed that I had all of the diseased bone removed, and thought that I would break off with the forceps some of the sharp joints of sound bone that would be likely to cause irritation. In doing this, I shortly discovered that the whole left inferior maxilla was detached from its periosteum, and also from its ligamentous attachments to the superior maxilla. I continued to work carefully, cutting but very little, as the tissues were in such a putrid condition that the pieces of bone would easily tear through them, until I removed the whole left maxilla, the last piece being about as large as a man's hand. I carefully washed out the blood and decayed tissue, and dressed with acidum carbol one part, water fifty parts, and ordered the

mouth washed twice daily with the same until I saw him again; also that the mare should be milked, and the milk and a small quantity of gruel be poured down the colt several times per day.

One week after, I saw him, and found he had nearly recovered the use of the tongue, and the ulcers healing rapidly. He was then allowed to nurse the mare and would drink gruel from a pail. I ordered sponging of the mouth as before, but used a weaker solution. I did not see him again for four weeks, when, to my surprise, I found that nature had commenced to create a new jawbone; and in two months nature had fully accomplished her work, and a new jawbone was fully formed, but a little thicker than the other, but no teeth have yet appeared. The colt is in fine condition, and able to eat hay and grain as well as any colt. No one, from his external appearance, would notice the difference in his maxillaries.

As to the cause, I am unable to say, but I am of the opinion that there had been a comminuted fracture of the jaw, and necrosis had been the result. Allowing that to be the case, would it not be better, in case a young and valuable animal should by accident badly fracture the jaw, to carefully remove all of the splinters and detached bone, and let nature have a chance rather than to order the animal destroyed?

Respectfully yours,

C. D. SMEAD, V.S.

LOGAN, N. Y., April 12th, 1878.

J. C. MCKENZIE, Esq.,

Dear Sir:—Yours of April 8th has just arrived, asking for a more definite account of the removal of the maxilla which I reported to your Association. (As to the amount of bone that I removed, I think that I stated that I removed the whole of the left inferior maxilla, from the second nipper back to its articulation with the glenoid fossa of the squamous temporal; or, in short, the whole of the left inferior maxilla bone, including one nipper and all the molars upon that side). I think I can see, from the tenor of your letter, a disposition to doubt the truth of

my report, and do not wonder at it, for I consider it a remarkable work of nature; and although I was advised to report it by physicians, I have always objected, for the reason that I knew that some would think it untrue. A few months ago I reported it to Prof. Law, of Cornell University, for the benefit of his students. He complimented and thanked me for it, also stating that he had known of similar cases of reproduction in other parts, where the periosteum was not destroyed. (Now I again repeat, that I removed at the time and place that I stated in my report to you, the whole of the left inferior maxilla, from the second nipper back to its joint, and if further proof is requested, I will furnish the affidavit of the owner, Mr. Peter Swartout, of the town of Lodi, Seneca County, New York, and several others who saw it; also, if your Association wish to bear the expense, I will send the horse for your inspection.) I have only one correction to make in my previous report. That is in regard to the teeth. I think I stated that no teeth had appeared, but I saw the animal on the 10th of this month (who by the way is now owned by Robert Faucett, of Lodi, N. Y.) and he has three malformed molar teeth upon that jaw.

Respectfully yours,

C. D. Smead, V.S.

CORRECTION.

Through inexplicable typographical errors, the article on the Etiology of Spavin, by our correspondent, Wm. Bryden, V.S., has been much disfigured in our June number, and we take this opportunity to correct it.

Page 107, lines 5 and 11. "The causes of the new-born formation," should read, "new bone formation." Line 23 and 33, "a recently sprained," and "recently strained," should be "recently spavined"; and line 34 "when detected," should read, "when detached."